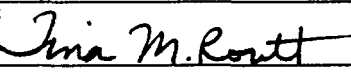
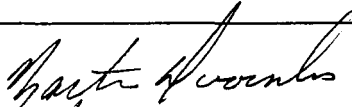

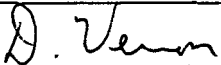


# **Engineering Design File**

## **IDAPA Preliminary Air Screening Results**



Form 412.14  
07/24/2001  
Rev. 03

1. Title: IDAPA Preliminary Air Screening Results				
2. Project File No.: NA				
3. Site Area and Building No.: NA			4. SSC Identification/Equipment Tag No.: NA	
5. Summary: This document presents the calculations for air compliance for nonradionuclide constituents. An evaluation of IDAPA 58.01.01.585 and 58.01.01.586 requirements was made for nonradionuclide constituents. The system being evaluated includes operations and maintenance of the INEEL CERCLA Disposal Facility (ICDF) landfill, evaporation ponds, and Staging, Storage, Sizing, and Treatment Facility (SSSTF).				
6. Review (R) and Approval (A) and Acceptance (Ac) Signatures: (See instructions for definitions of terms and significance of signatures.)				
	R/A	Typed Name/Organization	Signature	Date
Performer		Tina Routt/ CH2M HILL		05/14/02
Checker	R	(Same as Independent Peer Reviewer)		05/14/02
Independent Peer Reviewer	A	Marty Doornbos/ BBWI		05/14/02
Approver	A	Thomas Borschel/ BBWI		05/14/02
Requestor	Ac	Don Vernon/ BBWI		05/14/02
7. Distribution: (Name and Mail Stop)		M. Doornbos, MS 3930; D. Vernon, MS 3930; T. Borschel, MS 3930		
8. Records Management Uniform File Code (UFC):				
Disposition Authority:			Retention Period:	
EDF pertains to NRC licensed facility or INEEL SNF program?: <input type="checkbox"/> Yes <input type="checkbox"/> No				
9. Registered Professional Engineer's Stamp (if required)				

## **ABSTRACT**

This document presents the preliminary calculations for air screening of nonradionuclide constituents. An evaluation of Idaho Administrative Procedures Act 58.01.01.585 and 58.01.01.586 requirements was made for nonradionuclide constituents. The system being evaluated includes operations and maintenance of the INEEL CERCLA Disposal Facility landfill, evaporation ponds, and Staging, Storage, Sizing, and Treatment Facility.



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Appendix A—*SCREEN3* Model—Output File

Appendix B—Back-Calculation of Maximum Allowable Soil Concentrations and Comparison to WAC Concentrations



## ACRONYMS

AAC	ambient air concentration
AACC	annual ambient air concentration
ARARs	applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EDF	engineering design file
EL	emission level
EPA	Environmental Protection Agency
ICDF	INEEL CERCLA Disposal Facility
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
INEEL	Idaho National Environmental Engineering Laboratory
MEI	maximally exposed individual
NA	not applicable
NTV	no tabled value
OU	operating unit
RF	release factor
ROD	Record of Decision
SCRAM	Support Center for Regulatory Air Models
SVOC	semi-volatile organic compound
SSSTF	Staging, Storage, Sizing, and Treatment Facility
VOC	volatile organic compound
WAC	Waste Acceptance Criteria





# IDAPA Preliminary Air Screening Results

## 1. PURPOSE

The purpose of this preliminary air screening evaluation engineering design file (EDF) is to evaluate Idaho Administrative Procedures Act (IDAPA) 58.01.01.585 and 58.01.01.586 requirements. IDAPA regulations require a direct comparison of inventory to tabled values given in IDAPA 58.01.01.585 and 58.01.01.586. If all constituents are below the tabled values, no further analysis is required. For any constituents exceeding the tabled values, IDAPA requires performance of modeling of those constituents.

Modeling used in this evaluation consists of a screening model *SCREEN3*, which is listed on the Environmental Protection Agency's (EPA's) Support Center for Regulatory Air Models (SCRAM) website (SCRAM 2000) as a screening tool that can be used preceding a refined modeling analysis (if refinement is required). This screening model is a simple, single-source Gaussian plume model that provides maximum ground-level concentrations for point, area, flare, and volume sources. The model is suitable to this air evaluation due to the fact that there is only one area source and there are no sensitive receptors (58.01.01.007.10) within 0.4 km (.25 mile) of the facility. A more detailed dispersion model (e.g., *ISC3* [SCRAM 2000]) will be prepared for determination of operational limitations for each constituent included in both the design inventory and the appropriate IDAPA 585/586 tables. This detailed model will be prepared as part of a subsequent remedial action work plan.

The system being evaluated includes operations and maintenance of the INEEL CERCLA Disposal Facility (ICDF) landfill, evaporation ponds, and activities at the Staging, Storage, Sizing, and Treatment Facility (SSSTF).

### 1.1 Requirements

The applicable or relevant and appropriate requirements (ARARs) identified in the Final Record of Decision (ROD) operation unit (OU) 3-13 (DOE-ID 1999) include the state requirements listed in IDAPA 58.01.01.585 and 58.01.01.586 for nonradionuclides.

### 1.2 IDAPA Evaluation

This evaluation included a preliminary comparison of nonradionuclides to the tabled values given in the Idaho Administrative Code, IDAPA 58.01.01.585 and 58.01.01.586. Section 223.04 *Exemption Criteria and Reporting Requirements for Toxic Air Pollutant Emissions*, "Level III Exemption" of this code describes the reporting requirements for toxic air pollutants. Under this requirement, no permit to construct for toxic air pollutants is required for a source that satisfies reporting limits listed in IDAPA 58.01.01.585 and 58.01.01.586. For constituents that exceeded the reporting limits, modeling using *SCREEN3* was performed.

For a Level III exemption, "the source shall satisfy the following criteria:

- a) The uncontrolled concentration at the point of compliance [i.e., INEEL site boundary] (Section 210), for all toxic air pollutants emitted by the source shall be less than or equal to all applicable ambient concentrations listed in Sections 585 and 586; and

- b) The controlled emission rate for all toxic air pollutants emitted by the source shall be less than or equal to all applicable screening emission levels listed in Sections 585 and 586.”

This requirement is further described in Section 210.06 “Uncontrolled Ambient Conditions.” These requirements are listed below:

- a) “Compare the source’s or modification’s uncontrolled ambient concentration at the point of compliance for the toxic air pollutant to the applicable acceptable ambient concentration listed in Section 585 or 586.
- b) If the source’s or modification’s uncontrolled ambient concentration at the point of compliance is less than or equal to the applicable acceptable ambient concentration, no further procedures for demonstrating preconstruction compliance will be required for that toxic air pollutant as part of the application process.”

## 2. GIVEN/ASSUMED INFORMATION

The operations associated with the remediation activities that must be considered include the air screening for activities associated with the landfill, and storage, handling, and disposal of waste at the ICDF Complex. Table 2-1 lists the nonradionuclide design inventory and the tabled values from IDAPA 58.01.01.585 and 58.01.01.586. These values consist of given information in this analysis. This table also includes the comparison to IDAPA 58.01.01.585 and 58.01.01.586, which is discussed in Section 3.2.

### 2.1 Evaluation Outline

#### 2.1.1 Calculations Required for Comparison to Tabled Values

The given design inventory (EDF-ER-264) for the soil was converted to an inventory in air using the following calculations:

1. Determine the total mass of soil from the source in a single year (i.e., the ICDF Complex). This was calculated by assuming that 36% of the total capacity of the landfill (510,000 yd<sup>3</sup>) would be used in a given year of operation (EDF-ER-290). This gives an annual volume of 183,600 yd<sup>3</sup>/yr. This volume was then multiplied by the density of the loose, moist soil (3,477 lb/yd<sup>3</sup>) in the geotechnical report (DOE-ID 2000a) to determine the total mass of soil for a single year (638 million lb<sub>m</sub>/yr) (see Table 2-1, footnote a).
2. Determine the annual contamination for each constituent. This was calculated by taking the total mass of soil for a single year (kg) and multiplying it by the design inventory for each constituent (mg/kg). This gives the annual contamination mass (mg), which was then converted to lb<sub>m</sub> for comparison to the emission level (EL) values given in IDAPA 58.01.01.585 and 58.01.01.586. This mass was then divided by the total number of hours in a single year to give an emission rate for each constituent (lb<sub>m</sub>/hr).
3. Determine the amount of each contamination that would be released into the air. Release factors (RF) were applied to each of the emission rates calculated in the previous step. For volatile constituents an RF of 1.0 was used, for semi-volatile constituents and miscellaneous other constituents an RF of 1E - 03 and was used, and inorganic constituents an RF of 1E - 06 was used. The basis for determining which constituents are volatile or semi-volatile is from DOE-ID 2000b, and laboratory testing methodologies (e.g., 8021B, 8260B, 8270C, 8275A, and 8410) (EPA 1997).
4. Compare the calculated emission rate to the EL values listed in IDAPA 58.01.01.585 and 58.01.01.586. The factored emission rates were then directly compared to the listed values. The results of this comparison are shown in Table 2-1 (see "Direct Comparison" column for both IDAPA 58.01.01.585 and 58.01.01.586 evaluations).
5. Evaluate results of comparison. For values that are below listed values, no further evaluation is required. (Note that for several constituents no tabled values are listed in the IDAPA 58.01.01.585 and 58.01.01.586 tables. No additional evaluation was performed for these constituents.) For values that are above the listed values, a screening model *SCREEN3* was used.

Results of the modeling are shown in Table 2-2. The use of this screening model for this EDF evaluation is supported by both the IDAPA requirements as well as the 40 CFR 51, Appendix W requirements.

Table 2-1. Preliminary comparison of nonradionuclide constituents to IDAPA 58.01.01.585 and 58.01.01.586 screening emission levels.

IDAPA 58.01.01.585											IDAPA 58.01.01.586			
Constituent	Design Inventory (Soil) (mg/kg)	Annual Contamination <sup>a</sup> (lb <sub>m</sub> )	Release Factor <sup>b</sup>	Inventory Air (lb/hr) <sup>c</sup>	Emission Levels (EL) (lb/hr)	Acceptable Ambient Concentrations (AAC)		Emission Levels (EL) (lb/hr)	Acceptable Ambient Concentrations (AACC)		Direct Comparison <sup>d</sup>			
						(mg/m <sup>3</sup> )	(lb/hr)		(μg/m <sup>3</sup> )	(lb/hr)				
1,1,1-Trichloroethane	1.57E - 02	1.00E + 01	1.00E + 00	1.14E - 03	1.27E + 02	9.55E + 01	NTV	NTV	NTV	NTV	NA			
1,1,1,2,2-Tetrachloroethane	4.95E - 05	3.16E - 02	1.00E + 00	3.60E - 06	NTV	NTV	NTV	1.10E - 05	1.70E - 02	1.10E - 05	NA			
1,1,1,2-trichloroethane	2.42E - 04	1.55E - 01	1.00E + 00	1.76E - 05	NTV	NTV	NTV	4.20E - 04	6.20E - 02	4.20E - 04	NA			
1,1,1-Dichloroethane	2.34E - 03	1.49E + 00	1.00E + 00	1.70E - 04	2.70E + 01	2.05E + 01	NTV	2.50E - 04	3.80E - 02	2.50E - 04	NA			
1,1,1-Dichloroethene	1.48E - 03	9.44E - 01	1.00E + 00	1.08E - 04	NTV	NTV	NTV	2.50E - 04	3.38E + 00	2.50E - 04	NA			
1,2,4-Trichlorobenzene	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	2.47E + 00	1.85E + 00	NTV	NTV	NTV	NTV	NA			
1,2-Dichlorobenzene	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	2.00E + 01	1.50E + 01	NTV	2.50E - 04	3.80E - 02	2.50E - 04	NA			
1,2-dichloroethane	5.38E - 06	3.43E - 03	1.00E + 00	3.92E - 07	2.67E + 00	2.00E + 00	NTV	2.50E - 04	3.80E - 02	2.50E - 04	NA			
1,2-Dichloroethene (total)	3.24E - 04	2.07E - 01	1.00E + 00	2.36E - 05	5.27E + 01	3.95E + 01	NTV	NTV	NTV	NTV	NA			
1,3-Dichlorobenzene <sup>g</sup>	1.14E - 02	7.26E + 00	1.00E + 00	8.29E - 04	NTV	NTV	NTV	NTV	NTV	NTV	NA			
1,4-Dichlorobenzene	4.50E - 01	2.87E + 02	1.00E - 03	3.28E - 05	3.00E + 01	2.25E + 01	NTV	NTV	NTV	NTV	NA			
1,4-Dioxane	1.88E - 05	1.20E - 02	1.00E + 00	1.37E - 06	NTV	NTV	NTV	4.80E - 03	7.10E - 01	4.80E - 03	NA			
2,4,5-Trichlorophenol	4.46E - 02	2.85E + 01	1.00E - 03	3.25E - 06	NTV	1.60E - 03	NTV	NTV	NTV	NTV	NA			
2,4,6-Trichlorophenol	1.83E - 02	1.17E + 01	1.00E - 03	1.33E - 06	NTV	NTV	NTV	1.20E - 03	1.80E - 01	1.20E - 03	NA			
2,4-Dichlorophenol	2.16E - 02	1.38E + 01	1.00E - 03	1.57E - 06	NTV	NTV	NTV	NTV	NTV	NTV	NA			
2,4-Dimethylphenol	1.83E - 02	1.17E + 01	1.00E - 03	1.33E - 06	NTV	NTV	NTV	NTV	NTV	NTV	NA			
2,4-Dinitrophenol	5.09E - 02	3.25E + 01	1.00E - 03	3.71E - 06	NTV	NTV	NTV	NTV	NTV	NTV	NA			
2,4-Dinitrotoluene	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	NTV	NTV	NTV	NTV	NA			
2,6-Dinitrotoluene	2.07E - 02	1.32E + 01	1.00E - 03	1.51E - 06	NTV	NTV	NTV	NTV	NTV	NTV	NA			
2-Butanone, see Methyl ethyl ketone	2.47E - 02	1.58E + 01	1.00E + 00	1.80E - 03	3.93E + 01	2.95E + 01	NTV	NTV	NTV	NTV	NA			
2-Chloronaphthalene	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	NTV	NTV	NTV	NTV	NA			
2-Chlorophenol (and all isomers) (ID)	1.83E - 02	1.17E + 01	1.00E - 03	1.33E - 06	3.30E - 02	2.50E - 02	NTV	NTV	NTV	NTV	NA			
2-Hexanone, see Methyl n-butyl ketone	2.70E - 03	1.72E + 00	1.00E + 00	1.96E - 04	1.33E + 00	1.00E + 00	NTV	NTV	NTV	NTV	NA			

Table 2-1. (continued).

IDAPA 58.01.01.585										IDAPA 58.01.01.586			
Constituent	Design Inventory (Soil) (mg/kg)	Annual Contamination <sup>a</sup> (lb <sub>m</sub> )	Release Factor <sup>b</sup>	Inventory Air (lb/hr) <sup>c</sup>	Emission Levels (EL) (lb/hr)	Acceptable Ambient Concentrations		Emission Levels (EL) (lb/hr)	Acceptable Ambient Concentrations				
						(AACC) (mg/m <sup>3</sup> )	Direct Comparison <sup>d</sup>		(AACC) (μg/m <sup>3</sup> )	Direct Comparison <sup>d</sup>			
2-Methylnaphthalene	5.12E - 01	3.27E + 02	1.00E - 03	3.73E - 05	NTV	NTV	NA	NTV	NTV	NA			
2-Methylphenol	2.06E - 02	1.32E + 01	1.00E - 03	1.50E - 06	1.47E + 00	1.10E + 00		NTV	NTV	NA			
2-Nitroaniline	2.72E - 02	1.74E + 01	1.00E - 03	1.98E - 06	NTV	NTV	NA	NTV	NTV	NA			
2-Nitrophenol	1.83E - 02	1.17E + 01	1.00E - 03	1.33E - 06	NTV	NTV	NA	NTV	NTV	NA			
3,3'-Dichlorobenzidine	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	NA	NTV	NTV	NA			
3-Methyl Butenyl	2.23E - 04	1.43E - 01	1.00E - 03	1.63E - 08	NTV	NTV	NA	NTV	NTV	NA			
3-Nitroaniline	2.72E - 02	1.74E + 01	1.00E - 03	1.98E - 06	NTV	NTV	NA	NTV	NTV	NA			
4,6-Dinitro-2-methylphenol	4.46E - 02	2.85E + 01	1.00E - 03	3.25E - 06	1.30E - 02	1.00E - 02		NTV	NTV	NA			
4-Bromophenyl-phenyl ether	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	NA	NTV	NTV	NA			
4-Chloro-3-methylphenol	1.83E - 02	1.17E + 01	1.00E - 03	1.33E - 06	NTV	NTV	NA	NTV	NTV	NA			
4-Chloroaniline	4.08E - 02	2.60E + 01	1.00E - 03	2.97E - 06	NTV	NTV	NA	NTV	NTV	NA			
4-Chlorophenyl-phenylether	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	NA	NTV	NTV	NA			
4-Methyl-2-Pentanone	2.96E - 02	1.89E + 01	1.00E + 00	2.16E - 03	1.37E + 01	1.03E + 01		NTV	NTV	NA			
4-Methylphenol	3.86E - 02	2.46E + 01	1.00E - 03	2.81E - 06	1.47E + 00	1.10E + 00		NTV	NTV	NA			
4-Nitroaniline	2.72E - 02	1.74E + 01	1.00E - 03	1.98E - 06	2.00E - 01	1.50E - 01		NTV	NTV	NA			
4-Nitrophenol	5.16E - 02	3.29E + 01	1.00E - 03	3.75E - 06	NTV	NTV	NA	NTV	NTV	NA			
Acenaphthene	2.02E - 01	1.29E + 02	1.00E - 03	1.47E - 05	NTV	NTV	NA	NTV	NTV	NA			
Acenaphthylene	2.07E - 02	1.32E + 01	1.00E - 03	1.51E - 06	NTV	NTV	NA	NTV	NTV	NA			
Acetone	6.20E - 01	3.96E + 02	1.00E + 00	4.52E - 02	1.19E + 02	8.90E + 01		NTV	NTV	NA			
Acetonitrile	1.88E - 05	1.20E - 02	1.00E + 00	1.37E - 06	4.47E + 00	3.35E + 00		NTV	NTV	NA			
Acrolein	9.06E - 06	5.78E - 03	1.00E + 00	6.60E - 07	1.70E - 02	1.25E - 02		NTV	NTV	NA			
Acrylonitrile	9.06E - 06	5.78E - 03	1.00E + 00	6.60E - 07	NTV	NTV	NA	9.80E - 05	1.50E - 02				
Aluminum	7.08E + 03	4.52E + 06	1.00E - 06	5.15E - 04	6.67E - 01	5.00E - 01		NTV	NTV	NA			
Anthracene	3.20E - 01	2.04E + 02	1.00E - 03	2.33E - 05	NTV	NTV	NA	NTV	NTV	NA			

Table 2-1. (continued).

		IDAPA 58.01.01.585				IDAPA 58.01.01.586			
Constituent	Design Inventory (Soil) (mg/kg)	Annual Contamination <sup>a</sup> (lb <sub>m</sub> )	Release Factor <sup>b</sup>	Inventory Air (lb/hr) <sup>c</sup>	Acceptable Ambient Concentrations		Acceptable Ambient Concentrations		Direct Comparison <sup>d</sup>
					Emission Levels (EL) (lb/hr)	(AAC) (mg/m <sup>3</sup> )	Emission Levels (EL) (lb/hr)	(AACC) (μg/m <sup>3</sup> )	
Antimony & compounds, as Sb (handling & use)	5.83E + 00	3.72E + 03	1.00E - 06	4.25E - 07	3.30E - 02	2.50E - 02	NTV	NTV	NA
Aramite	1.15E - 04	7.31E - 02	1.00E - 03	8.34E - 09	NTV	NTV	9.30E - 04	1.40E - 01	NA
Aroclor-1016	7.69E - 03	4.91E + 00	1.00E - 03	5.60E - 07	NTV	NTV	6.60E - 05	1.00E - 02	NA
Aroclor-1254	7.69E - 03	4.91E + 00	1.00E - 03	5.60E - 07	NTV	NTV	6.60E - 05	1.00E - 02	NA
Aroclor-1260	7.69E - 03	4.91E + 00	1.00E - 03	5.60E - 07	NTV	NTV	6.60E - 05	1.00E - 02	NA
Aroclor-1268	7.69E - 03	4.91E + 00	1.00E - 03	5.60E - 07	NTV	NTV	6.60E - 05	1.00E - 02	NA
Arsenic compounds	5.65E + 00	3.61E + 03	1.00E - 06	4.12E - 07	NTV	NTV	1.50E - 06	2.30E - 04	NA
Barium, soluble compounds, as Ba	1.79E + 02	1.15E + 05	1.00E - 06	1.31E - 05	3.30E - 02	2.50E - 02	NTV	NTV	NA
Benzene	6.03E - 01	3.85E + 02	1.00E + 00	4.39E - 02	NTV	NTV	8.00E - 04	1.20E - 01	HIGH
Benzidine	2.91E - 04	1.86E - 01	1.00E - 03	2.12E - 08	NTV	NTV	9.90E - 08	1.50E - 05	NA
Benzo(a)anthracene	2.53E - 01	1.62E + 02	1.00E - 03	1.84E - 05	NTV	NTV	NTV	NTV	NA
Benzo(a)pyrene	1.05E - 01	6.69E + 01	1.00E - 03	7.64E - 06	NTV	NTV	2.00E - 06	3.00E - 04	HIGH
Benzo(b)fluoranthene	1.79E - 01	1.15E + 02	1.00E - 03	1.31E - 05	NTV	NTV	NTV	NTV	NA
Benzo(g,h,i)perylene	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	NTV	NTV	NA
Benzo(k)fluoranthene	1.86E - 02	1.19E + 01	1.00E - 03	1.35E - 06	NTV	NTV	NTV	NTV	NA
Benzoic acid	8.56E - 03	5.46E + 00	1.00E - 03	6.23E - 07	NTV	NTV	NTV	NTV	NA
Beryllium & compounds	2.87E - 01	1.83E + 02	1.00E - 06	2.09E - 08	NTV	NTV	2.80E - 05	4.20E - 03	NA
bis(2-Chloroethoxy)methane	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	NTV	NTV	NA
bis(2-Chloroethyl)ether	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	2.00E - 05	3.00E - 03	NA
bis(2-Chloroisopropyl)ether <sup>g</sup>	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	3.30E - 04	5.00E - 02	NA
bis(2-Ethylhexyl)phthalate	1.47E - 01	9.39E + 01	1.00E - 03	1.07E - 05	NTV	NTV	2.80E - 02	4.20E + 00	NA
Boron (as anhydrous tetra borate)	1.85E + 02	1.18E + 05	1.00E - 06	1.34E - 05	6.70E - 02	5.00E - 02	NTV	NTV	NA

Table 2-1. (continued).

IDAPA 58.01.01.585										IDAPA 58.01.01.586			
Constituent	Design Inventory (Soil) (mg/kg)	Annual Contamination <sup>a</sup> (lb <sub>m</sub> )	Release Factor <sup>b</sup>	Inventory Air (lb/hr) <sup>c</sup>	Emission Levels (EL) (lb/hr)	Acceptable Ambient Concentrations		Emission Levels (EL) (lb/hr)	Acceptable Ambient Concentrations		Direct Comparison <sup>d</sup>	Direct Comparison <sup>d</sup>	
						(AAC) (mg/m <sup>3</sup> )	(AACC) (μg/m <sup>3</sup> )		(AAC) (mg/m <sup>3</sup> )	(AACC) (μg/m <sup>3</sup> )			
Butane, 1,1,3,4-Tetrachloro-	4.95E - 05	3.16E - 02	1.00E - 03	3.60E - 09	NTV	NTV	NTV	NTV	NTV	NTV	NA	NTV	NA
Butylbenzylphthalate	6.79E - 02	4.34E + 01	1.00E - 03	4.95E - 06	NTV	NTV	NTV	NTV	NTV	NTV	NA	NTV	NA
Cadmium and compounds	3.59E + 00	2.29E + 03	1.00E - 06	2.61E - 07	NTV	NTV	NTV	3.70E - 06	5.60E - 04	NTV	NA	NTV	NA
Calcium (as calcium carbonate)	2.04E + 04	1.30E + 07	1.00E - 06	1.49E - 03	6.67E - 01	5.00E - 02	5.00E - 02	NTV	NTV	NTV	NA	NTV	NA
Carbazole	3.23E - 02	2.07E + 01	1.00E - 03	2.36E - 06	NTV	NTV	NTV	NTV	NTV	NTV	NA	NTV	NA
Carbon disulfide	4.55E - 02	2.91E + 01	1.00E + 00	3.32E - 03	2.00E + 00	1.50E + 00	1.50E + 00	NTV	NTV	NTV	NA	NTV	NA
Chloride (as chlorine)	1.87E + 00	1.19E + 03	1.00E - 03	1.36E - 04	2.00E - 01	1.50E - 01	1.50E - 01	NTV	NTV	NTV	NA	NTV	NA
Chlorobenzene	6.57E - 03	4.20E + 00	1.00E + 00	4.79E - 04	2.33E + 01	1.75E + 01	1.75E + 01	NTV	NTV	NTV	NA	NTV	NA
Chloroethane-see-Ethyl chloride	3.02E - 06	1.93E - 03	1.00E + 00	2.20E - 07	1.76E + 02	1.32E + 02	1.32E + 02	NTV	NTV	NTV	NA	NTV	NA
Chloromethane	3.53E - 04	2.25E - 01	1.00E + 00	2.57E - 05	6.69E + 00	5.15E + 00	5.15E + 00	1.90E - 03	2.80E - 01	NTV	NA	NTV	NA
Chromium (III) compounds, as Cr	4.12E + 01	2.63E + 04	1.00E - 06	3.00E - 06	3.30E - 02	2.50E - 02	2.50E - 02	NTV	NTV	NTV	NA	NTV	NA
Chrysene	2.65E - 01	1.69E + 02	1.00E - 03	1.93E - 05	NTV	NTV	NTV	NTV	NTV	NTV	NA	NTV	NA
Cobalt (metal, dust & fume)	6.04E + 00	3.85E + 03	1.00E - 06	4.40E - 07	3.30E - 03	2.50E - 03	2.50E - 03	NTV	NTV	NTV	NA	NTV	NA
Copper (dusts & mists)	2.99E + 01	1.91E + 04	1.00E - 06	2.18E - 06	6.70E - 02	5.00E - 02	5.00E - 02	NTV	NTV	NTV	NA	NTV	NA
Cyanide and compounds as CN	3.37E - 01	2.15E + 02	1.00E - 03	2.45E - 05	3.33E - 01	2.50E - 01	2.50E - 01	NTV	NTV	NTV	NA	NTV	NA
Cyclonite	1.00E + 00	6.38E + 02	1.00E - 03	7.28E - 05	1.00E - 01	7.50E - 02	7.50E - 02	NTV	NTV	NTV	NA	NTV	NA
Diacetone alcohol	2.96E - 02	1.89E + 01	1.00E - 03	2.16E - 06	1.60E + 01	1.20E + 01	1.20E + 01	NTV	NTV	NTV	NA	NTV	NA
Dibenz(a,h)anthracene	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	NTV	NTV	NTV	NTV	NA	NTV	NA
Dibenzofuran	3.24E - 01	2.07E + 02	1.00E - 03	2.36E - 05	NTV	NTV	NTV	NTV	NTV	NTV	NA	NTV	NA
Diethylphthalate	1.14E - 02	7.27E + 00	1.00E - 03	8.29E - 07	3.33E - 01	2.50E - 01	2.50E - 01	NTV	NTV	NTV	NA	NTV	NA
Dimethyl Disulfide	2.96E - 03	1.89E + 00	1.00E - 03	2.15E - 07	NTV	NTV	NTV	NTV	NTV	NTV	NA	NTV	NA
Dimethylphthalate	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	3.33E - 01	2.50E - 01	2.50E - 01	NTV	NTV	NTV	NA	NTV	NA

Table 2-1. (continued).

IDAPA 58.01.01.585										IDAPA 58.01.01.586	
Constituent	Design Inventory (Soil) (mg/kg)	Annual Contamination <sup>a</sup> (lb <sub>m</sub> )	Release Factor <sup>b</sup>	Inventory Air (lb/hr) <sup>c</sup>	Emission Levels (EL) (lb/hr)	Acceptable Ambient Concentrations		Emission Levels (EL) (lb/hr)	Acceptable Ambient Concentrations (AACC) (μg/m <sup>3</sup> )	Direct Comparison <sup>d</sup>	
						(AAC) (mg/m <sup>3</sup> )	(AACC) (μg/m <sup>3</sup> )				
Di-n-butylphthalate	2.39E - 02	1.52E + 01	1.00E - 03	1.74E - 06	3.33E - 01	2.50E - 01		NTV	NTV	NA	
Di-n-octylphthalate	2.62E - 02	1.67E + 01	1.00E - 03	1.91E - 06	3.33E - 01	2.50E - 01		NTV	NTV	NA	
Dysprosium	5.93E + 01	3.79E + 04	1.00E - 03	4.32E - 03	NTV	NTV	NA	NTV	NTV	NA	
Eicosane	2.83E - 03	1.81E + 00	1.00E - 03	2.06E - 07	NTV	NTV	NA	NTV	NTV	NA	
Ethyl cyanide (as cyanide)	1.88E - 05	1.20E - 02	1.00E + 00	1.37E - 06	3.33E - 01	2.50E - 01		NTV	NTV	NA	
Ethylbenzene	7.81E - 02	4.98E + 01	1.00E + 00	5.69E - 03	2.90E + 01	2.18E + 01		NTV	NTV	NA	
Famphur	5.81E - 05	3.71E - 02	1.00E - 03	4.23E - 09	NTV	NTV	NA	NTV	NTV	NA	
Fluoranthene	7.62E - 01	4.87E + 02	1.00E - 03	5.55E - 05	NTV	NTV	NA	NTV	NTV	NA	
Fluorides, as F	3.87E + 00	2.47E + 03	1.00E - 03	2.82E - 04	1.67E - 01	1.25E - 01		NTV	NTV	NA	
Heptadecane, 2,6,10,15-Tetra	3.44E - 03	2.20E + 00	1.00E - 03	2.50E - 07	NTV	NTV	NA	NTV	NTV	NA	
Hexachlorobenzene	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	NA	1.30E - 05	2.00E - 03		
Hexachlorobutadiene	2.07E - 02	1.32E + 01	1.00E - 03	1.51E - 06	NTV	NTV	NA	3.30E - 04	5.00E - 02		
Hexachloro-cyclopentadiene	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	7.00E - 03	5.00E - 03		NTV	NTV	NA	
Hexachloroethane	1.14E - 02	7.26E + 00	1.00E + 00	8.29E - 04	NTV	NTV	NA	1.70E - 03	2.50E - 01		
Indeno(1,2,3-cd)pyrene	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	NA	NTV	NTV	NA	
Iron (iron salts, soluble, as Fe)	1.02E + 04	6.54E + 06	1.00E - 06	7.46E - 04	6.70E - 02	5.00E - 02		NTV	NTV	NA	
Isobutyl alcohol	1.88E - 05	1.20E - 02	1.00E + 00	1.37E - 06	1.00E + 01	6.00E + 00		NTV	NTV	NA	
Isophorone	1.14E - 02	7.27E + 00	1.00E - 03	8.29E - 07	1.87E + 04	1.40E + 00		NTV	NTV	NA	
Isopropyl Alcohol/2-propanol	6.20E - 01	3.96E + 02	1.00E + 00	4.52E - 02	6.53E + 01	4.90E + 01		NTV	NTV	NA	
Kepone	9.92E - 02	6.33E + 01	1.00E - 03	7.22E - 06	NTV	NTV	NA	NTV	NTV	NA	
Lead	5.76E + 01	3.68E + 04	1.00E - 06	4.19E - 06	NTV	NTV	NA	NTV	NTV	NA	
Magnesium (magnesium oxide fume)	4.47E + 03	2.86E + 06	1.00E - 06	3.26E - 04	6.67E - 01	5.00E - 01		NTV	NTV	NA	



Table 2-1. (continued).

		IDAPA 58.01.01.585				IDAPA 58.01.01.586			
Constituent	Design Inventory (Soil) (mg/kg)	Annual Contamination <sup>a</sup> (lb <sub>m</sub> )	Release Factor <sup>b</sup>	Inventory Air (lb/hr) <sup>c</sup>	Acceptable Ambient Concentrations		Acceptable Ambient Concentrations		Direct Comparison <sup>d</sup>
					Emission Levels (EL) (lb/hr)	Concentrations (AAC) (mg/m <sup>3</sup> )	Emission Levels (EL) (lb/hr)	Concentrations (AACC) (µg/m <sup>3</sup> )	
Manganese as Mn (dust and compounds)	2.07E + 02	1.32E + 05	1.00E - 06	1.51E - 05	3.33E - 01	2.50E - 01	NTV	NTV	NA
Mercury (inorganic)	9.45E + 00	6.03E + 03	1.00E - 06	6.88E - 07	7.00E - 03	5.00E - 03	NTV	NTV	NA
Mesityl oxide	2.96E - 02	1.89E + 01	1.00E - 03	2.16E - 06	4.00E + 00	3.00E + 00	NTV	NTV	NA
Methyl acetate	4.84E - 04	3.09E - 01	1.00E + 00	3.53E - 05	4.07E + 01	3.05E + 01	NTV	NTV	NA
Methylene Chloride	8.36E - 02	5.34E + 01	1.00E + 00	6.09E - 03	NTV	NTV	NA	1.60E - 03	HIGH
Molybdenum as Mo	1.02E + 01	6.50E + 03	1.00E - 06	7.41E - 07	3.33E - 01	2.50E - 01	NTV	NTV	NA
Soluble compounds									
Naphthalene	4.25E - 01	2.71E + 02	1.00E - 03	3.10E - 05	3.33E + 00	2.50E + 00	NTV	NTV	NA
Nickel	1.97E + 01	1.25E + 04	1.00E - 06	1.43E - 06	NTV	NTV	NA	2.70E - 05	4.20E - 03
Nitrate (as nitric acid)	3.93E + 00	2.51E + 03	1.00E - 03	2.86E - 04	3.33E - 01	2.50E - 01	NTV	NTV	NA
Nitrate/Nitrite-N (as nitric acid)	2.22E - 01	1.42E + 02	1.00E - 03	1.62E - 05	3.33E - 01	2.50E - 01	NTV	NTV	NA
Nitrite (as nitric acid)	8.49E - 03	5.42E + 00	1.00E - 03	6.18E - 07	3.33E - 01	2.50E - 01	NTV	NTV	NA
Nitrobenzene	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	3.33E - 01	2.50E - 01	NTV	NTV	NA
N-Nitroso-di-n-propylamine	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	NA	NTV	NA
N-Nitrosodiphenylamine	1.14E - 02	7.26E + 00	1.00E - 03	8.29E - 07	NTV	NTV	NA	NTV	NA
Octane, 2,3,7-Trimethyl	1.61E - 04	1.03E - 01	1.00E - 03	1.18E - 08	9.33E + 01	7.00E + 01	NTV	NTV	NA
o-Toluenesulfonamide	5.06E - 03	3.23E + 00	1.00E - 03	3.68E - 07	NTV	NTV	NA	NTV	NA
Pentachlorophenol	5.59E - 02	3.57E + 01	1.00E - 03	4.07E - 06	3.30E - 02	2.50E - 02	NTV	NTV	NA
Phenanthrene	1.17E + 00	7.46E + 02	1.00E - 03	8.51E - 05	NTV	NTV	NA	NTV	NA
Phenol	7.98E - 02	5.09E + 01	1.00E - 03	5.81E - 06	1.27E + 00	9.50E - 01	NTV	NTV	NA
Phenol, 2,6-Bis(1,1-Dimethyl)	1.83E - 02	1.17E + 01	1.00E - 03	1.33E - 06	NTV	NTV	NA	NTV	NA
Phosphorus	9.74E + 01	6.22E + 04	1.00E - 06	7.09E - 06	7.00E - 03	5.00E - 03	NTV	NTV	NA
Potassium (as potassium hydroxide)	1.13E + 03	7.20E + 05	1.00E - 06	8.21E - 05	1.33E - 01	1.00E - 01	NTV	NTV	NA

Table 2-1. (continued).

IDAPA 58.01.01.585										IDAPA 58.01.01.586		
Constituent	Design Inventory (Soil) (mg/kg)	Annual Contamination <sup>a</sup> (lb <sub>m</sub> )	Release Factor <sup>b</sup>	Inventory Air (lb/hr) <sup>c</sup>	Emission Levels (EL) (lb/hr)	Acceptable Ambient Concentrations		Emission Levels (EL) (lb/hr)	Acceptable Ambient Concentrations			
						(AAC) (mg/m <sup>3</sup> )	Direct Comparison <sup>d</sup>		(AACC) (µg/m <sup>3</sup> )	Direct Comparison <sup>d</sup>		
p-Toluenesulfonamide	5.06E - 03	3.23E + 00	1.00E - 03	3.68E - 07	NTV	NTV	NA	NTV	NTV	NA		
Pyrene	2.53E - 01	1.62E + 02	1.00E - 03	1.84E - 05	NTV	NTV	NA	NTV	NTV	NA		
Selenium	8.46E - 01	5.40E + 02	1.00E - 06	6.16E - 08	1.30E - 02	1.00E - 02		NTV	NTV	NA		
Silver Soluble compounds, as Ag	9.84E + 00	6.28E + 03	1.00E - 06	7.16E - 07	1.00E - 03	5.00E - 03		NTV	NTV	NA		
Sodium (as sodium hydroxide)	2.11E + 02	1.35E + 05	1.00E - 06	1.54E - 05	1.33E - 01	1.00E - 01		NTV	NTV	NA		
Strontium	1.82E + 01	1.16E + 04	1.00E - 03	1.33E - 03	NTV	NTV	NA	NTV	NTV	NA		
Styrene (styrene monomer)	1.03E - 06	6.55E - 04	1.00E + 00	7.47E - 08	6.67E + 00	1.00E + 00		NTV	NTV	NA		
Sulfate (as sulfuric acid)	2.05E + 01	1.31E + 04	1.00E - 03	1.50E - 03	6.70E - 02	5.00E - 02		NTV	NTV	NA		
Sulfide (as sulfuric acid)	7.59E + 02	4.84E + 05	1.00E - 03	5.52E - 02	6.70E - 02	5.00E - 02		NTV	NTV	NA		
Terbium	5.73E + 02	3.66E + 05	1.00E - 03	4.17E - 02	NTV	NTV	NA	NTV	NTV	NA		
Tetrachloroethene (as tetrachloroethylene)	9.64E - 03	6.15E + 00	1.00E + 00	7.02E - 04	NTV	NTV	NA	1.30E - 02	2.00E + 00			
Thallium, soluble Compounds, as Tl	3.70E - 01	2.36E + 02	1.00E - 06	2.70E - 08	7.00E - 03	5.00E - 03		NTV	NTV	NA		
Toluene (toluol)	9.82E - 01	6.27E + 02	1.00E + 00	7.15E - 02	2.50E + 01	1.88E + 01		NTV	NTV	NA		
Tributylphosphate	3.64E - 01	2.32E + 02	1.00E - 03	2.65E - 05	1.47E - 01	1.10E - 01		NTV	NTV	NA		
Trichloroethene (as trichloroethylene)	7.20E - 02	4.60E + 01	1.00E + 00	5.25E - 03	1.79E + 01	1.35E + 01		NTV	NTV	NA		
Trinitrotoluene	1.00E + 00	6.38E + 02	1.00E - 03	7.28E - 05	NTV	NTV	NA	NTV	NTV	NA		
Undecane,4,6-Dimethyl-	1.61E - 04	1.03E - 01	1.00E - 03	1.18E - 08	NTV	NTV	NA	NTV	NTV	NA		
Vanadium, as V2O5	2.12E + 01	1.36E + 04	1.00E - 06	1.55E - 06	3.00E - 03	2.50E - 03		NTV	NTV	NA		
Respirable Dust & fume												
Xylene (o-, m-,p-isomers)	3.45E + 00	2.21E + 03	1.00E + 00	2.52E - 01	2.90E + 01	2.18E + 01		NTV	NTV	NA		
Ytterbium	1.95E + 02	1.25E + 05	1.00E - 03	1.42E - 02	6.70E - 02	5.00E - 02		NTV	NTV	NA		
Zinc metal (ID)	2.08E + 02	1.33E + 05	1.00E - 06	1.51E - 05	6.67E - 01	5.00E - 01		NTV	NTV	NA		

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	Design Inventory (Soil) (mg/kg)	Annual Contamination <sup>a</sup> (lb <sub>m</sub> )	Release Factor <sup>b</sup>	Inventory Air (lb/hr) <sup>c</sup>	Emission Levels (EL) (lb/hr)	Acceptable Ambient Concentrations (AAC) (mg/m <sup>3</sup> )	Acceptable Ambient Concentrations (AACC) (µg/m <sup>3</sup> )
						Direct Comparison <sup>d</sup>	Direct Comparison <sup>d</sup>
Zirconium compounds as Zr	6.91E + 01	4.41E + 04	1.00E - 06	5.03E - 06	3.33E - 01	2.50E - 01	NTV
							NA

NTV = No tabled value given in IDAPA 58.01.01.585 and 58.01.01.586.

a. Total mass of material to be disposed at ICDF in a given year is calculated using the following equation:

**Total Mass = Total Volume of ICDF and Pond for a single year x density of soil**

36% Total Design Volume:

(Total volume 510,000 yd<sup>3</sup> \* 36%)

### Density of Soil:

**Total mass/year:**

**Total mass/year:**

The total mass (kg) is multiplied by the soil inventory (mg/kg) to determine mass of each constituent in the soil (mg). This mass is then converted to pounds for comparison with tabled values.

- b. An RF is used to determine the amount of a constituent that is reasonably expected to become airborne. Since VOCs have a potential for 100% release, an RF of 1.0 was used. However, there is currently no regulatory guidance for determination of RFs for chemical constituents; therefore, an RF of 1.0E - 03 has been assumed for all SVOC constituents and 1.0E - 6 for all inorganic constituents (e.g., metals), since it is reasonable to assume significantly less of these constituents could potentially become airborne.
- c. Annual contamination (lbm) is divided by 8,766 hours/year to obtain a comparable value to IDAPA 58.01.01.585 and 58.01.01.586 EL values.
- d. This is a direct comparison of the Design Inventory in Air to the EL values listed in IDAPA 58.01.01.585 and 58.01.01.586. For constituents that indicate "HIGH", further analysis is required. Results of this further analysis are shown in Table 2-2. For cells that are blank or indicate "NA" the evaluation is complete.
- e. The density shown is a wet density using a dry density of 3,280.5 lb/yd<sup>3</sup> and a moisture content of 6% (DOE-ID 2000a).
- f. Classification of constituents into VOC, SVOC, etc. for determination of RF are based in part on DOE-ID 2000b. For constituents not listed there, laboratory testing methods 8021B, 8260B, 8270C, 8275A, and 8410 (EPA 1997) were used to classify constituents.
- g. These constituents are listed as both a VOC and SVOC in laboratory sampling methodologies. The RF values for VOCs have been used for added conservatism.

### 2.1.2 Calculations Required for Modeling using *SCREEN3*

The *SCREEN3* model calculates ground-level concentrations at specified distances, including the INEEL site boundary, which is the point of compliance. Inputs to this model include the source type (e.g., area, point, flair), emission rate (g/s-m<sup>2</sup>), source height, length, and width of the source, height of the receptor, and location of source (e.g., urban or rural). Input values used are as follows:

1. Source type: area
2. Emission rate: This was calculated using the following equation: Emission rate (g/s-m<sup>2</sup>) = (Volume of soil/year × density of soil / seconds per year) / area of source. [(510,000 yd<sup>3</sup> × 36%) × (3,477 lb/yd<sup>3</sup>) × (454 g/lb) / 3.16 × 10<sup>7</sup> sec/yr] / 129,600 m<sup>2</sup> = 0.0708 g/s-m<sup>2</sup>
3. Source height: 1 m
4. Length and width of source (estimated based on total area of ICDF and evaporation pond): 360 m x 360 m
5. Receptor height: 2 m
6. Location of source: Rural.

Results of the model gave a calculated concentration at specific distances from the source. The output of the *SCREEN3* model is included in Appendix A. The value at the closest INEEL site boundary (11,418 m) was used for the remaining evaluation. The concentration at the boundary calculated by *SCREEN3* (1.85E + 05 µg/m<sup>3</sup>) was multiplied by the original soil inventory for each modeled constituent. Per IDAPA 58.01.01, a persistence factor of 0.125 was then applied. This value was then compared directly to the acceptable ambient concentrations (mg/m<sup>3</sup>) listed in IDAPA 58.01.01.585 and 58.01.01.586. These results are shown in Table 2-2. The model showed that benzene and methylene chloride are below annual acceptable ambient concentrations (AACC), but that benzo(a)pyrene exceeds the AACC.

Table 2-2. Comparison of modeling results with constituents exceeding IDAPA 58.01.01.585 and 58.01.01.586 acceptable ambient concentrations.

Constituent	Design Inventory (Soil) (mg/kg)	IDAPA 585 (24-Hour) Acceptable Ambient Concentrations (AAC) (mg/m <sup>3</sup> )	IDAPA 586 (Annual) Acceptable Ambient Concentrations (AACC) (µg/m <sup>3</sup> )	SCREEN3™ Modeled Concentration (µg/m <sup>3</sup> ) <sup>a</sup>	Comparison of Modeling Results IDAPA 585	Comparison of Modeling Results IDAPA 586
Benzene	6.03E - 01	NTV	1.20E - 01	1.40E - 02	NA	OK
Benzo(a)pyrene	1.05E - 01	NTV	3.00E - 04	2.42E - 03	NA	Operationally Limited
Methylene Chloride	8.36E - 02	NTV	2.40E - 01	1.93E - 03	NA	OK

NA = Not applicable. No tabled value listed for comparison.

NTV = No tabled value given in IDAPA 58.01.01.585.

a. This value was determined by multiplying the SCREEN3 modeled concentration at the closest boundary by the design inventory for each constituent and multiplied by a persistence factor per IDAPA 58.01.01 (e.g., for benzene 1.85E + 05 µg/m<sup>3</sup> × 6.03E - 01 mg/kg × 1.0E - 06 kg/mg × 0.125 = 1.40E - 05 µg/m<sup>3</sup>).

### **3. CONCLUSIONS**

The preliminary evaluation (comparison to IDAPA 58.01.01.585 and 58.01.01.586 tabled values) determined that three constituents exceeded the tabled values. Each of these constituents was then modeled using *SCREEN3*. The model showed that all constituents are below the acceptable ambient concentrations listed in IDAPA 58.01.01.585 and 58.01.01.586, except for benzo(a)pyrene. Development of operational limits will be performed as part of the remedial action work plan, as described in Section 4.

## 4. DEVELOPMENT OF OPERATIONAL LIMITS

The modeling performed for this EDF was to show that the landfill's design inventory is in compliance with IDAPA 585/586 tabled values. As a precursor to the operational modeling activities, a comparison of "maximum allowable" concentrations to the waste acceptance criteria (WAC) (DOE-ID 2002) concentrations was performed and is included in Appendix B.

This "back-calculation" is to determine the maximum allowable soil concentrations (mg/kg) that will meet the IDAPA 585/586 tabled emission levels (lb/hr). It is based on similar parameters used in development of Table 2-1 (e.g., same soil mass, density); however, for this calculation it has been assumed that all materials will be released (i.e., RF = 1). Also included in this calculation is a list of the WAC values and a comparison of these WAC values to the maximum allowable soil concentrations. Instances when the WAC values exceed the calculated maximum concentrations have also been identified. The following equation (1) was used to develop the maximum allowable concentrations.

$$\text{Max}_{\text{Allowable}} \frac{\text{mg}}{\text{kg}} = \frac{\left( \text{fEL} \frac{\text{lb}}{\text{hr}} \times 365 \frac{\text{days}}{\text{year}} \times 24 \frac{\text{hours}}{\text{day}} \right)}{\text{RF} \times 2.2\text{E}-06 \frac{\text{lb}}{\text{mg}} \times \text{MASS} \frac{\text{kg}}{\text{year}}} \quad (1)$$

where,

$\text{Max}_{\text{Allowable}}$  = Operational Limit (mg/kg)

f = factor applied to IDAPA 585/586 tables for iterative approach

EL = IDAPA 585/586 emission levels (lb/hr)

RF = 1.0

MASS = total mass of soil evaluated is based on 36% of the total capacity of landfill.

A more refined modeling effort will be performed as part of the remedial action work plan in order to develop operational limits for the ICDF and associated facilities. The EPA approved models proposed for this evaluation include an emissions model, *WATER9*, and a dispersion model, *ISC3*.

- Emission modeling:

SSSTF and ICDF Landfill: The *WATER9* is proposed for modeling emissions of the ICDF. This model estimates VOC emissions from treatment, storage, and disposal facility processes. The emissions model is described in the EPA Handbook for Air Toxics Emission Inventory Development: Volume I: Stationary Sources (EPA 1998) and Air Emissions Models for Waste and Wastewater (EPA 1994). The model includes calculations of emissions from disposal impoundments, closed landfills, land treatment facilities, and aeration and nonaeration impoundment processes. Input parameters include landfill design and operation parameters, waste physical characteristics, and hazardous waste chemical properties. Advantages are that the model was designed for landfill operations of hazardous wastes and estimates emissions based on compound specific chemical properties, etc. (potentially most accurate).

Disadvantages are that the model can be complex to run if a large number of compounds have been identified and the amount of input parameters is potentially significant (as well as the amount of assumptions).

Evaporation Pond: For the evaporation pond, the proposed emission model is *WATER9*. This program is an analytical model for estimating compound-specific air emissions from wastewater collection and treatment systems. The emissions model is described in the EPA document Air Emissions Models for Waste and Wastewater (EPA 1994).

- Dispersion modeling:

It is proposed that the final modeling analysis for primary toxic air pollutants of concern (e.g., for those constituents that exceed ELs and/or AAC/AACCs) will be performed using a refined dispersion model. *ISC3* is the proposed preferred refined model. Data inputs include a meteorological package (developed from site-specific data), coordinates for receptor locations (coordinates), source locations (coordinates), elevations, emission rates and parameters, hours of operation, building dimensions, terrain descriptions, sensitive receptors/receptor locations, co-contributing sources, etc., meeting EPA and Idaho Department of Environmental Quality (IDEQ) guidelines.

A modeling protocol identifying the proposed modeling procedures will be prepared in accordance to IDEQ guidelines and then submitted for approval prior to use.

## 5. REFERENCES

- 40 CFR 51, *Code of Federal Regulations*, "Appendix W, To Part 51—Guideline On Air Quality Models", Washington, D.C.
- DOE-ID, 2002, *Waste Acceptance Criteria for ICDF Landfill*, DOE/ID-10865, Rev. 2, U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho, May 2002.
- DOE-ID, 2000a, *Geotechnical Report for the Conceptual Design of the INEEL CERCLA Disposal Facility at Waste Area Group 3, Operable Unit 3-13*, DOE/ID-10812, Rev. 0, U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho.
- DOE-ID, 2000b, *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites*, DOE/ID-10587, Rev. 6, U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho.
- DOE-ID, 1999, *Final Record of Decision, Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13*, DOE/ID-10660, Rev. 0, Department of Energy Idaho Operations Office, Idaho Falls, Idaho, U.S. Environmental Protection Agency Region 10, and State of Idaho Department of Health and Welfare.
- EDF-ER-264, 2001, "INEEL CERCLA Disposal Facility Design Inventory," Rev. A, Environmental Restoration Program, Idaho National Engineering and Environmental Laboratory, March 2001.
- EDF-ER-290, 2002, "NESHAP Modeling for ICDF Complex," Rev. 1, Environmental Restoration Program, Idaho National Engineering and Environmental Laboratory, May 2002.
- EPA, 1998, *Handbook for Air Toxics Emission Inventory Development: Volume I: Stationary Sources* EPA-454/B-98-002, U.S. Environmental Protection Agency.
- EPA, 1997, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd Edition, as amended by Updates I (July, 1992), IIA (August, 1993), IIB (January, 1995), and III, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1994, *Air Emissions Models for Waste and Wastewater*, EPA-453/R-94-080A, U.S. Environmental Protection Agency.
- IDAPA 58.01.01, 1994, "Rules for the Control of Air Pollution in Idaho," Idaho Administrative Procedures Act, Idaho Department of Environmental Quality (as promulgated May 1, 1994).
- SCRAM, 2002, Support Center for Regulatory Air Models (SCRAM), *SCREEN3*, *ISC3*, <http://www.epa.gov/ttn/scram/>, U.S. Environmental Protection Agency.



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**Appendix A**  
***SCREEN3* Model—Output File**

03/19/02

11:20:10

\*\*\* SCREEN3 MODEL RUN \*\*\*

\*\*\* VERSION DATED 96043 \*\*\*

CID 023 - EDF-315 IDAPA COMPLIANCE

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = AREA  
EMISSION RATE (G/(S-M\*\*2)) = .708000E-01  
SOURCE HEIGHT (M) = 1.0000  
LENGTH OF LARGER SIDE (M) = 360.0000  
LENGTH OF SMALLER SIDE (M) = 360.0000  
RECEPTOR HEIGHT (M) = 2.0000  
URBAN/RURAL OPTION = RURAL

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.

THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

BUOY. FLUX = .000 M\*\*4/S\*\*3; MOM. FLUX = .000 M\*\*4/S\*\*2.

\*\*\* FULL METEOROLOGY \*\*\*

\*\*\*\*\*

\*\*\* SCREEN DISCRETE DISTANCES \*\*\*

\*\*\*\*\*

\*\* TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES \*\*

DIST (M)	CONC (UG/M**3)	U10M STAB	USTK (M/S)	MIX (M/S)	HT (M)	PLUME HT (M)	MAX DIR (DEG)
100.	.4338E+07	6	1.0	1.0	10000.0	1.00	45.
500.	.3317E+07	6	1.0	1.0	10000.0	1.00	45.
1000.	.1849E+07	6	1.0	1.0	10000.0	1.00	45.
5000.	.4716E+06	6	1.0	1.0	10000.0	1.00	44.
11418.	.1846E+06	6	1.0	1.0	10000.0	1.00	45.
20000.	.9455E+05	6	1.0	1.0	10000.0	1.00	43.
30000.	.5861E+05	6	1.0	1.0	10000.0	1.00	37.
40000.	.4229E+05	6	1.0	1.0	10000.0	1.00	31.
50000.	.3283E+05	6	1.0	1.0	10000.0	1.00	42.
60000.	.1334E+05	6	2.0	2.0	10000.0	1.00	31.

\*\*\*\*\*

\*\*\* SUMMARY OF SCREEN MODEL RESULTS \*\*\*

\*\*\*\*\*

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	.4338E+07	100.	0.

\*\*\*\*\*

\*\* REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS \*\*

\*\*\*\*\*

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## **Appendix B**

### **Back-Calculation of Maximum Allowable Soil Concentrations and Comparison to WAC Concentrations**

Table B-1. Back calculation of maximum allowable soil concentration for comparison to WAC concentrations.

Constituent	Back Calculation of Allowable Soil Inventory (Based on IDAPA 585 and 586 Tabled Emission Levels [lb/hr])				Comparison of WAC Values to Maximum Soil Concentration Allowable		
	IDAPA 58.01.01.585	IDAPA 58.01.01.586	Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)		(If WAC > Allowable Soil Conc = Operationally Limited (EXCEED))		
	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)	Maximum Allowable Soil Inventory for 586 Comparison (mg/kg)	WAC Concentration (10865 App D) (mg/kg)	Comparison of WAC to Max Value (IDAPA 585)	Comparison of WAC to Max Value (IDAPA 586)
1,1,1-Trichloroethane	1.27E + 02	NTV	1.75E + 03	NTV	1.6E + 01	OK	NA
1,1,2,2-Tetrachloroethane	NTV	1.10E - 05	NTV	1.51E - 04	5.0E - 02	NA	Operationally limited
1,1,2-trichloroethane	NTV	4.20E - 04	NTV	5.77E - 03	2.4E - 01	NA	Operationally limited
1,1-Dichloroethane	2.70E + 01	2.50E - 04	3.71E + 02	3.44E - 03	2.3E + 00	OK	Operationally limited
1,1-Dichloroethene	NTV	2.50E - 04	NTV	3.44E - 03	1.5E + 00	NA	Operationally limited
1,2,4-Trichlorobenzene	2.47E + 00	NTV	3.40E + 01	NTV	1.1E + 01	OK	NA
1,2-Dichlorobenzene	2.00E + 01	NTV	2.75E + 02	NTV	1.1E + 01	OK	NA
1,2-dichloroethane	2.67E + 00	2.50E - 04	3.67E + 01	3.44E - 03	5.4E - 03	OK	Operationally limited
1,2-Dichloroethene (total)	5.27E + 01	2.50E - 04	7.25E + 02	3.44E - 03	3.2E - 01	OK	Operationally limited
1,3-Dichlorobenzene <sup>s</sup>	NTV	NTV	NTV	NTV	1.1E + 01	NA	NA
1,4-Dichlorobenzene	3.00E + 01	NTV	4.12E + 02	NTV	4.4E + 01	Operationally limited	NA
1,4-Dioxane	NTV	4.80E - 03	NTV	6.60E - 02	1.9E - 02	NA	OK
2,4,5-Trichlorophenol	NTV	NTV	NTV	NTV	4.5E + 01	NA	NA

Table B-1. (continued).

Constituent	IDAPA 58.01.01.585		IDAPA 58.01.01.586		Back Calculation of Allowable Soil Inventory (Based on IDAPA 585 and 586 Tabled Emission Levels [lb/hr])		Comparison of WAC Values to Maximum Soil Concentration Allowable (If WAC > Allowable Soil Conc = Operationally Limited (EXCEED))		
	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)	Maximum Allowable Soil Inventory for 586 Comparison (mg/kg)	WAC Concentration (10865 App D) (mg/kg)	Comparison of WAC to Max Value (IDAPA 585)	Comparison of WAC to Max Value (IDAPA 586)
2,4,6-Trichlorophenol	NTV	1.20E - 03	NTV	NTV	NTV	1.65E - 02	1.8E + 01	NA	Operationally limited
2,4-Dichlorophenol	NTV	NTV	NTV	NTV	NTV	NTV	2.2E + 01	NA	NA
2,4-Dimethylphenol	NTV	NTV	NTV	NTV	NTV	NTV	1.8E + 01	NA	NA
2,4-Dinitrophenol	NTV	NTV	NTV	NTV	NTV	NTV	5.1E + 01	NA	NA
2,4-Dinitrotoluene	NTV	NTV	NTV	NTV	NTV	NTV	1.1E + 01	NA	NA
2,6-Dinitrotoluene	NTV	NTV	NTV	NTV	NTV	NTV	2.1E + 01	NA	NA
2-Butanone, see Methyl ethyl ketone	3.93E + 01	NTV	NTV	5.40E + 02	NTV	NTV	2.5E + 01	OK	NA
2-Chloronaphthalene	NTV	NTV	NTV	NTV	NTV	NTV	1.1E + 01	NA	NA
2-Chlorophenol (and all isomers) (ID)	3.30E - 02	NTV	NTV	4.54E - 01	NTV	NTV	1.8E + 01	Operationally limited	NA
2-Hexanone, see Methyl n-butyl ketone	1.33E + 00	NTV	NTV	1.83E + 01	NTV	NTV	2.7E + 00	OK	NA
2-Methylnaphthalene	NTV	NTV	NTV	NTV	NTV	NTV	5.1E + 02	NA	NA
2-Methylphenol	1.47E + 00	NTV	NTV	2.02E + 01	NTV	NTV	2.1E + 01	Operationally limited	NA
2-Nitroaniline	NTV	NTV	NTV	NTV	NTV	NTV	1.0E - 01	NA	NA
2-Nitrophenol	NTV	NTV	NTV	NTV	NTV	NTV	1.8E + 01	NA	NA
3,3'-Dichlorobenzidine	NTV	NTV	NTV	NTV	NTV	NTV	1.1E + 01	NA	NA
3-Methyl Butenyl	NTV	NTV	NTV	NTV	NTV	NTV	3.3E + 04	NA	NA

Table B-1. (continued).

Constituent	Back Calculation of Allowable Soil Inventory (Based on IDAPA 585 and 586 Tabled Emission Levels [lb/hr])				Comparison of WAC Values to Maximum Soil Concentration Allowable		
	IDAPA 58.01.01.585	IDAPA 58.01.01.586	Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)	Maximum Allowable Soil Inventory for 586 Comparison (mg/kg)	WAC Concentration (10865 App D) (mg/kg)	(If WAC > Allowable Soil Conc = Operationally Limited (EXCEED))	
	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)				Comparison of WAC to Max Value (IDAPA 585)	Comparison of WAC to Max Value (IDAPA 586)
3-Nitroaniline	NTV	NTV	NTV	NTV	1.0E - 01	NA	NA
4,6-Dinitro-2-methylphenol	1.30E - 02	NTV	1.79E - 01	NTV	4.5E + 01	Operationally limited	NA
4-Bromophenyl-phenyl ether	NTV	NTV	NTV	NTV	8.5E + 04	NA	NA
4-Chloro-3-methylphenol	NTV	NTV	NTV	NTV	9.6E + 04	NA	NA
4-Chloroaniline	NTV	NTV	NTV	NTV	4.1E + 01	NA	NA
4-Chlorophenyl-phenylether	NTV	NTV	NTV	NTV	1.0E + 05	NA	NA
4-Methyl-2-Pentanone	1.37E + 01	NTV	1.88E + 02	NTV	3.0E + 01	OK	NA
4-Methylphenol	1.47E + 00	NTV	2.02E + 01	NTV	3.9E + 01	Operationally limited	NA
4-Nitroaniline	2.00E - 01	NTV	2.75E + 00	NTV	1.0E - 01	OK	NA
4-Nitrophenol	NTV	NTV	NTV	NTV	5.2E + 01	NA	NA
Acenaphthene	NTV	NTV	NTV	NTV	2.0E + 02	NA	NA
Acenaphthylene	NTV	NTV	NTV	NTV	2.1E + 01	NA	NA
Acetone	1.19E + 02	NTV	1.64E + 03	NTV	9.9E + 01	OK	NA
Acetonitrile	4.47E + 00	NTV	6.15E + 01	NTV	1.2E + 00	OK	NA
Acrolein	1.70E - 02	NTV	2.34E - 01	NTV	5.5E - 01	Operationally limited	NA
Acrylonitrile	NTV	9.80E - 05	NTV	1.35E - 03	5.8E - 01	NA	Operationally limited



Table B-1. (continued).

Table B-1. (continued).										
Comparison of WAC Values to Maximum Soil Concentration Allowable										
Back Calculation of Allowable Soil Inventory (Based on IDAPA 585 and 586 Tabled Emission Levels [lb/hr])										
(If WAC > Allowable Soil Conc = Operationally Limited (EXCEED))										
IDAPA 58.01.01.585		IDAPA 58.01.01.586	Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)		Maximum Allowable Soil Inventory for 586 Comparison (mg/kg)		WAC Concentration (10865 App D) (mg/kg)		Comparison of WAC to Max Value (IDAPA 585)	Comparison of WAC to Max Value (IDAPA 586)
Constituent	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)
Aluminum	6.67E - 01	NTV	NTV	9.17E + 00	NTV	1.6E + 05	Operationally limited	NA	Operationally limited	NA
Anthracene	NTV	NTV	NTV	NTV	NTV	3.2E + 02	NA	NA	Operationally limited	NA
Antimony & compounds, as Sb (handling & use)	3.30E - 02	NTV	NTV	4.54E - 01	NTV	5.8E + 03	Operationally limited	NA	Operationally limited	NA
Aramite	NTV	9.30E - 04	NTV	NTV	1.28E - 02	6.7E + 00	NA	Operationally limited	Operationally limited	Operationally limited
Aroclor-1016	NTV	6.60E - 05	NTV	NTV	9.07E - 04	7.7E + 00	NA	Operationally limited	Operationally limited	Operationally limited
Aroclor-1254	NTV	6.60E - 05	NTV	NTV	9.07E - 04	1.3E + 02	NA	Operationally limited	Operationally limited	Operationally limited
Aroclor-1260	NTV	6.60E - 05	NTV	NTV	9.07E - 04	5.0E + 02	NA	Operationally limited	Operationally limited	Operationally limited
Aroclor-1268	NTV	6.60E - 05	NTV	NTV	9.07E - 04	6.2E + 01	NA	Operationally limited	Operationally limited	Operationally limited
Arsenic compounds	NTV	1.50E - 06	NTV	NTV	2.06E - 05	5.8E + 01	NA	Operationally limited	Operationally limited	Operationally limited
Barium, soluble compounds, as Ba	3.30E - 02	NTV	4.54E - 01	NTV	3.0E + 03	Operationally limited	NA	Operationally limited	Operationally limited	Operationally limited
Benzene	NTV	8.00E - 04	NTV	1.10E - 02	2.2E + 02	Operationally limited	NA	Operationally limited	Operationally limited	Operationally limited

Table B-1. (continued).

IDAPA 58.01.01.585		IDAPA 58.01.01.586	Back Calculation of Allowable Soil Inventory (Based on IDAPA 585 and 586 Tabled Emission Levels [lb/hr])		Comparison of WAC Values to Maximum Soil Concentration Allowable (If WAC > Allowable Soil Conc = Operationally Limited (EXCEED))		
Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)		Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)	Maximum Allowable Soil Inventory for 586 Comparison (mg/kg)	WAC Concentration (10865 App D) (mg/kg)	Comparison of WAC to Max Value (IDAPA 585)	Comparison of WAC to Max Value (IDAPA 586)
NTV	NTV	9.90E - 08	NTV	1.36E - 06	1.7E + 01	NA	Operationally limited
NTV	NTV	NTV	NTV	NTV	2.5E + 02	NA	NA
NTV	NTV	2.00E - 06	NTV	2.75E - 05	1.1E + 02	NA	Operationally limited
NTV	NTV	NTV	NTV	NTV	1.8E + 02	NA	NA
NTV	NTV	NTV	NTV	NTV	1.1E + 01	NA	NA
NTV	NTV	NTV	NTV	NTV	1.9E + 01	NA	NA
NTV	NTV	NTV	NTV	NTV	8.6E + 00	NA	NA
NTV	NTV	2.80E - 05	NTV	3.85E - 04	1.8E + 01	NA	Operationally limited
bis(2-Chloroethoxy)methane	NTV	NTV	NTV	NTV	1.6E + 02	NA	NA
bis(2-Chloroethyl)ether	NTV	2.00E - 05	NTV	2.75E - 04	1.1E + 01	NA	Operationally limited
bis(2-Chloroisopropyl)ether	NTV	3.30E - 04	NTV	4.54E - 03	1.1E + 01	NA	Operationally limited
bis(2-Ethylhexyl)phthalate	NTV	2.80E - 02	NTV	3.85E - 01	1.5E + 02	NA	Operationally limited
Boron (as anhydrous tetra borate)	6.70E - 02	NTV	9.21E - 01	NTV	3.3E + 03	Operationally limited	NA
Butane, 1,1,3,4-Tetrachloro-	NTV	NTV	NTV	NTV	1.0E + 05	NA	NA
Butylbenzylphthalate	NTV	NTV	NTV	NTV	6.8E + 01	NA	NA

Table B-1. (continued).

Constituent	IDAPA 58.01.01.585		IDAPA 58.01.01.586		Back Calculation of Allowable Soil Inventory (Based on IDAPA 585 and 586 Tabled Emission Levels [lb/hr])		Comparison of WAC Values to Maximum Soil Concentration Allowable (If WAC > Allowable Soil Conc = Operationally Limited (EXCEED))		
	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)	Maximum Allowable Soil Inventory for 586 Comparison (mg/kg)	WAC Concentration (10865 App D) (mg/kg)	Comparison of WAC to Max Value (IDAPA 585)	Comparison of WAC to Max Value (IDAPA 586)		
Cadmium and compounds	NTV	3.70E - 06	NTV	5.09E - 05	3.6E + 03	NA	Operationally limited		
Calcium (as calcium carbonate)	6.67E - 01	NTV	9.17E + 00	NTV	No Limit	NA	NA		
Carbazole	NTV	NTV	NTV	NTV	3.2E + 01	NA	NA		
Carbon disulfide	2.00E + 00	NTV	2.75E + 01	NTV	4.6E + 01	Operationally limited	NA		
Chloride (as chlorine)	2.00E - 01	NTV	2.75E + 00	NTV	3.3E + 04	Operationally limited	NA		
Chlorobenzene	2.33E + 01	NTV	3.20E + 02	NTV	6.6E + 00	OK	NA		
Chloroethane-see-Ethyl chloride	1.76E + 02	NTV	2.42E + 03	NTV	1.5E - 01	OK	NA		
Chloromethane	6.69E + 00	1.90E - 03	9.19E + 01	2.61E - 02	3.5E - 01	OK	Operationally limited		
Chromium (III) compounds, as Cr	3.30E - 02	NTV	4.54E - 01	NTV	4.1E + 04	Operationally limited	NA		
Chrysene	NTV	NTV	NTV	NTV	2.7E + 02	NA	NA		
Cobalt (metal, dust & fume)	3.30E - 03	NTV	4.54E - 02	NTV	1.1E + 02	Operationally limited	NA		
Copper (dusts & mists)	6.70E - 02	NTV	9.21E - 01	NTV	3.0E + 04	Operationally limited	NA		
Cyanide and compounds as CN	3.33E - 01	NTV	4.58E + 00	NTV	3.4E + 02	Operationally limited	NA		

Table B-1. (continued).

Constituent	IDAPA 58.01.01.585		IDAPA 58.01.01.586		Back Calculation of Allowable Soil Inventory (Based on IDAPA 585 and 586 Tabled Emission Levels [lb/hr])		Comparison of WAC Values to Maximum Soil Concentration Allowable (If WAC > Allowable Soil Conc = Operationally Limited (EXCEED))		
	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)	Maximum Allowable Soil Inventory for 586 Comparison (mg/kg)	WAC Concentration (10865 App D) (mg/kg)	Comparison of WAC to Max Value (IDAPA 585)	Comparison of WAC to Max Value (IDAPA 586)		
Cyclonite	1.00E - 01	NTV	1.37E + 00	NTV	No Limit	NA	NA	NA	
Diacetone alcohol	1.60E + 01	NTV	2.20E + 02	NTV	1.0E + 05	Operationally limited	NA	NA	
Dibenz(a,h)anthracene	NTV	NTV	NTV	NTV	1.1E + 01	NA	NA	NA	
Dibenzofuran	NTV	NTV	NTV	NTV	3.2E + 02	NA	NA	NA	
Diethylphthalate	3.33E - 01	NTV	4.58E + 00	NTV	1.1E + 01	Operationally limited	NA	NA	
Dimethyl Disulfide	NTV	NTV	NTV	NTV	3.3E + 04	NA	NA	NA	
Dimethylphthalate	3.33E - 01	NTV	4.58E + 00	NTV	1.1E + 01	Operationally limited	NA	NA	
Di-n-butylphthalate	3.33E - 01	NTV	4.58E + 00	NTV	2.4E + 01	Operationally limited	NA	NA	
Di-n-octylphthalate	3.33E - 01	NTV	4.58E + 00	NTV	2.6E + 01	Operationally limited	NA	NA	
Dysprosium	NTV	NTV	NTV	NTV	5.9E + 04	NA	NA	NA	
Eicosane	NTV	NTV	NTV	NTV	1.0E + 05	NA	NA	NA	
Ethyl cyanide (as cyanide)	3.33E - 01	NTV	4.58E + 00	NTV	3.3E + 04	Operationally limited	NA	NA	
Ethylbenzene	2.90E + 01	NTV	3.99E + 02	NTV	7.8E + 01	OK	NA	NA	
Famphur	NTV	NTV	NTV	NTV	1.0E + 05	NA	NA	NA	
Fluoranthene	NTV	NTV	NTV	NTV	7.6E + 02	NA	NA	NA	

Table B-1. (continued).

Constituent	IDAPA 58.01.01.585		IDAPA 58.01.01.586		Back Calculation of Allowable Soil Inventory (Based on IDAPA 585 and 586 Tabled Emission Levels [lb/hr])		Comparison of WAC Values to Maximum Soil Concentration Allowable (If WAC > Allowable Soil Conc = Operationally Limited (EXCEED))		
	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)	Maximum Allowable Soil Inventory for 586 Comparison (mg/kg)	WAC Concentration (10865 App D) (mg/kg)	Comparison of WAC to Max Value (IDAPA 585)	Comparison of WAC to Max Value (IDAPA 586)
Fluorides, as F	1.67E - 01	NTV	NTV	NTV	2.30E + 00	NTV	3.9E + 03	Operationally limited	NA
Heptadecane, 2,6,10,15-Tetra	NTV	NTV	NTV	NTV	NTV	NTV	3.3E + 04	NA	NA
Hexachlorobenzene	NTV	1.30E - 05	NTV	NTV	NTV	1.79E - 04	1.1E + 01	NA	Operationally limited
Hexachlorobutadiene	NTV	3.30E - 04	NTV	NTV	NTV	4.54E - 03	2.1E + 01	NA	Operationally limited
Hexachlorocyclopentadiene	7.00E - 03	NTV	NTV	NTV	9.62E - 02	NTV	1.1E + 01	Operationally limited	NA
Hexachloroethane	NTV	1.70E - 03	NTV	NTV	NTV	2.34E - 02	1.1E + 01	NA	Operationally limited
Indeno(1,2,3-cd)pyrene	NTV	NTV	NTV	NTV	NTV	NTV	1.1E + 01	NA	NA
Iron (iron salts, soluble, as Fe)	6.70E - 02	NTV	NTV	NTV	9.21E - 01	NTV	2.4E + 05	Operationally limited	NA
Isobutyl alcohol	1.00E + 01	NTV	NTV	NTV	1.37E + 02	NTV	1.2E + 00	OK	NA
Isophorone	1.87E + 04	NTV	NTV	NTV	2.57E + 05	NTV	1.1E + 01	OK	NA
Isopropyl Alcohol/2-propanol	6.53E + 01	NTV	NTV	NTV	8.98E + 02	NTV	1.0E + 05	Operationally limited	NA
Kepone	NTV	NTV	NTV	NTV	NTV	NTV	9.9E + 01	NA	NA
Lead	NTV	NTV	NTV	NTV	NTV	NTV	5.8E + 04	NA	NA
Magnesium (magnesium)	6.67E - 01	NTV	NTV	NTV	9.17E + 00	NTV	1.2E + 05	Operationally limited	NA

Table B-1. (continued).

Constituent oxide fume)	IDAPA 58.01.01.585		IDAPA 58.01.01.586		Back Calculation of Allowable Soil Inventory (Based on IDAPA 585 and 586 Tabled Emission Levels [lb/hr])		Comparison of WAC Values to Maximum Soil Concentration Allowable (If WAC > Allowable Soil Conc = Operationally Limited (EXCEED))		
	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)	Maximum Allowable Soil Inventory for 586 Comparison (mg/kg)	WAC Concentration (10865 App D) (mg/kg)	Comparison of WAC to Max Value (IDAPA 585)	Comparison of WAC to Max Value (IDAPA 586)
Manganese as Mn (dust and compounds)	3.33E - 01	NTV	NTV	NTV	4.58E + 00	NTV	4.9E + 03	Operationally limited	NA
Mercury (inorganic)	7.00E - 03	NTV	NTV	NTV	9.62E - 02	NTV	9.5E + 03	Operationally limited	NA
Mesityl oxide	4.00E + 00	NTV	NTV	NTV	5.50E + 01	NTV	1.0E + 05	Operationally limited	NA
Methyl acetate	4.07E + 01	NTV	NTV	NTV	5.60E + 02	NTV	4.8E - 01	OK	NA
Methylene Chloride	NTV	1.60E - 03	NTV	NTV	NTV	2.20E - 02	2.7E + 01	NA	Operationally limited
Molybdenum as Mo Soluble compounds	3.33E - 01	NTV	NTV	NTV	4.58E + 00	NTV	1.0E + 04	Operationally limited	NA
Naphthalene	3.33E + 00	NTV	NTV	NTV	4.58E + 01	NTV	4.3E + 02	Operationally limited	NA
Nickel	NTV	2.70E - 05	NTV	NTV	NTV	3.71E - 04	3.5E + 02	NA	Operationally limited
Nitrate (as nitric acid)	3.33E - 01	NTV	NTV	NTV	4.58E + 00	NTV	3.9E + 03	Operationally limited	NA
Nitrate/Nitrite-N (as nitric acid)	3.33E - 01	NTV	NTV	NTV	4.58E + 00	NTV	3.3E + 04	Operationally limited	NA
Nitrite (as nitric acid)	3.33E - 01	NTV	NTV	NTV	4.58E + 00	NTV	8.5E + 00	Operationally limited	NA

Table B-1. (continued).

Constituent	IDAPA 58.01.01.585		IDAPA 58.01.01.586		Back Calculation of Allowable Soil Inventory (Based on IDAPA 585 and 586 Tabled Emission Levels [lb/hr])		Comparison of WAC Values to Maximum Soil Concentration Allowable (If WAC > Allowable Soil Conc = Operationally Limited (EXCEED))		
	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)	Maximum Allowable Soil Inventory for 586 Comparison (mg/kg)	WAC Concentration (10865 App D) (mg/kg)	Comparison of WAC to Max Value (IDAPA 585)	Comparison of WAC to Max Value (IDAPA 586)		
Nitrobenzene	3.33E - 01	NTV	4.58E + 00	NTV	1.1E + 01	Operationally limited	NA		
N-Nitroso-di-n-propylamine	NTV	NTV	NTV	NTV	1.1E + 01	NA	NA		
N-Nitrosodiphenylamine	NTV	NTV	NTV	NTV	1.1E + 01	NA	NA		
Octane,2,3,7-Trimethyl	9.33E + 01	NTV	1.28E + 03	NTV	3.3E + 04	Operationally limited	NA		
o-Toluenesulfonamide	NTV	NTV	NTV	NTV	3.3E + 04	NA	NA		
Pentachlorophenol	3.30E - 02	NTV	4.54E - 01	NTV	5.6E + 01	Operationally limited	NA		
Phenanthrene	NTV	NTV	NTV	NTV	1.2E + 03	NA	NA		
Phenol	1.27E + 00	NTV	1.75E + 01	NTV	8.0E + 01	Operationally limited	NA		
Phenol,2,6-Bis(1,1-Dimethyl)	NTV	NTV	NTV	NTV	1.0E + 05	NA	NA		
Phosphorus	7.00E - 03	NTV	9.62E - 02	NTV	No Limit	NA	NA		
Potassium (as potassium hydroxide)	1.33E - 01	NTV	1.83E + 00	NTV	4.3E + 04	Operationally limited	NA		
p-Toluenesulfonamide	NTV	NTV	NTV	NTV	3.3E + 04	NA	NA		
Pyrene	NTV	NTV	NTV	NTV	2.5E + 02	NA	NA		
Selenium	1.30E - 02	NTV	1.79E - 01	NTV	8.5E + 02	Operationally limited	NA		

Table B-1. (continued).

IDAPA		IDAPA		Back Calculation of Allowable Soil Inventory (Based on IDAPA 585 and 586 Tabled Emission Levels [lb/hr])		Comparison of WAC Values to Maximum Soil Concentration Allowable (If WAC > Allowable Soil Conc = Operationally Limited (EXCEED))		
58.01.01.585	58.01.01.586	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)	Maximum Allowable Soil Inventory for 586 Comparison (mg/kg)	WAC Concentration (10865 App D) (mg/kg)	Comparison of WAC to Max Value (IDAPA 585)	Comparison of WAC to Max Value (IDAPA 586)
Silver Soluble compounds, as Ag	1.00E - 03	NTV	NTV	1.37E - 02	NTV	9.8E + 03	Operationally limited	NA
Sodium (as sodium hydroxide)	1.33E - 01	NTV	NTV	1.83E + 00	NTV	3.2E + 03	Operationally limited	NA
Strontium	NTV	NTV	NTV	NTV	NTV	1.8E + 04	NA	NA
Styrene (styrene monomer)	6.67E + 00	NTV	NTV	9.17E + 01	NTV	6.1E - 02	OK	NA
Sulfate (as sulfuric acid)	6.70E - 02	NTV	NTV	9.21E - 01	NTV	3.3E + 04	Operationally limited	NA
Sulfide (as sulfuric acid)	6.70E - 02	NTV	NTV	9.21E - 01	NTV	3.3E + 04	Operationally limited	NA
Terbium	NTV	NTV	NTV	NTV	NTV	No Limit	NA	NA
Tetrachloroethene (as tetrachloroethylene)	NTV	1.30E - 02	NTV	NTV	1.79E - 01	9.6E + 00	NA	Operationally limited
Thallium, soluble Compounds, as Tl	7.00E - 03	NTV	NTV	9.62E - 02	NTV	4.3E + 00	Operationally limited	NA
Toluene (toluol)	2.50E + 01	NTV	NTV	3.44E + 02	NTV	3.0E + 01	Operationally limited	NA
Tributylphosphate	1.47E - 01	NTV	NTV	2.02E + 00	NTV	4.8E + 02	Operationally limited	NA
Trichloroethene (as trichloroethylene)	1.79E + 01	NTV	NTV	2.46E + 02	NTV	3.1E + 01	OK	NA
Trinitrotoluene	NTV	NTV	NTV	NTV	NTV	1.1E + 01	NA	NA



Table B-1. (continued).

Constituent	IDAPA 58.01.01.585		IDAPA 58.01.01.586		Back Calculation of Allowable Soil Inventory (Based on IDAPA 585 and 586 Tabled Emission Levels [lb/hr])		Comparison of WAC Values to Maximum Soil Concentration Allowable (If WAC > Allowable Soil Conc = Operationally Limited (EXCEED))		
	Emission Levels (EL) (lb/hr)	Emission Levels (EL) (lb/hr)	Maximum Allowable Soil Inventory for 585 Comparison (mg/kg)		Maximum Allowable Soil Inventory for 586 Comparison (mg/kg)		WAC Concentration (10865 App D) (mg/kg)	Comparison of WAC to Max Value (IDAPA 585)	Comparison of WAC to Max Value (IDAPA 586)
Undecane,4,6-Dimethyl-	NTV	NTV	NTV	NTV	NTV	NTV	3.3E + 02	NA	NA
Vanadium, as V2O5 Respirable Dust & fume	3.00E - 03	NTV	4.12E - 02	NTV	NTV	NTV	4.5E + 02	Operationally limited	NA
Xylene (o-, m-, p-isomers)	2.90E + 01	NTV	3.99E + 02	NTV	NTV	NTV	2.8E + 02	Operationally limited	NA
Ytterbium	6.70E - 02	NTV	9.21E - 01	NTV	NTV	NTV	No Limit	NA	NA
Zinc metal (ID)	6.67E - 01	NTV	9.17E + 00	NTV	NTV	NTV	2.1E + 05	Operationally limited	NA
Zirconium compounds as Zr	3.33E - 01	NTV	4.58E + 00	NTV	NTV	NTV	No Limit	NA	NA

NA = Not applicable. No tabled value listed for comparison.

NTV = No tabled value given in IDAPA 585/586.